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ORIGINAL ARTICLES.

REMOVAL OF A FRAGMENT OF STEEL FROM THE VITREOUS CHAMBER BY MEANS OF THE ELECTRO-MAGNET, WITH PRESERVATION OF NEARLY NORMAL VISION.[1]

BY SAMUEL THEOBALD, M.D.,

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The successful employment of the electro-magnet for the removal of fragments of iron and steel from the vitreous of the eyeball has become of such frequent occurrence that one hesitates to report such cases unless they present features of especial interest. The fact that in the present instance the foreign body was not removed until the eleventh day after its entrance into the vitreous chamber, and the further fact that in an eye otherwise doomed to destruction nearly normal vision

[1] A paper read before the American Ophthalmological Society, July, 1892.

was restored through the magnet's efficient action, seemed features of sufficient interest to justify my presenting a brief report of the case to the Society.

C. H., æt. 12, was first seen April 1, 1892, in the out-patient department of the Baltimore Eye, Ear and Throat Charity Hospital. Six days before, while striking a hatchet with a hammer, a small fragment of steel has been broken from one of them and had struck his left eye with such force as to cause severe pain and much impairment of vision. The eye exhibited marked conjunctival injection, and upon closer inspection a small scar was discovered at the upper and outer corneal margin and just in line with this a hole in the iris, close to the periphery, of corresponding size. At the anterior pole of the lens, apparently just under the capsule, there was a slight opacity, and with the opthalmoscope, besides numerous floating opacities in the vitreous, so much diffuse clouding was discovered that the details of the fundus could not be distinguished. Vision was found to be $^{16}/_{CXXV}$. There was little room to doubt that the piece of steel was in the eye, although owing to the clouding of the vitreous humor its location could not be determined with the ophthalmoscope, and its removal with the electro-magnet was proposed. The instrument not being at hand, the operation was postponed until the next day. On the following day the chloride of silver ("dry cell") battery with which I had provided myself failed to produce in the magnet (Hirshberg's) any but the most feeble action, and a further postponement was unavoidable. An interval of four days occurred after this before an opportunity to operate upon the eye presented itself. In the meantime the inflammation had not lessened and iritis had set in. I had deciced misgivings as to the likelihood of my efforts to remove the foreign body being successful, after so long an interval from the date of the accident, but it was evident that enucleation at no distant day was the other alternative and, influenced by this consideration, I did not hesitate to undertake the operation. Chloroform was administered and antiseptic precautions, consisting in the sterilization of the magnet point and other instruments with

boiling water, and the flushing of the conjunctival sac with sublimate solution (1 to 8000), were exercised. A free longitudinal incision was made through the conjunctiva, between the external and inferior recti muscles, behind the ciliary body, and the tissues dissected back so as to expose the sclerotic at this point. A Beer's knife was then passed througe the sclerotic and inner tunics of the eye, making a longitudinal incision about 4 mm. in length. There was considerable hemorrhage, but the vitreous showed no tendency to escape. Although it had not been possible to locate the foreign body, the greater amount of opacity in the outer and lower quadrant of the vitreous humor and the accessibility of this part of the sclerotic determined the site of the incision.

The magnet point, freshly sterilized, was now introduced a short distance into the wound and withdrawn. Examination of the tip showed that the fragment of steel had not been attracted to it. A second, third, and possibly a fourth introduction of the point, which was pushed farther into the vitreous chamber and turned in various directions failed as completely to accomplish the desired result, and I almost concluded that it would be useless to make further attempts. I determined, however, to try once more, and this time probably carried the magnet point nearer to the ciliary body than I had done before, and upon withdrawing it I was rejoiced to find the bit of steel adhering to it. It was irregular in shape, having one edge especially sharp, measured about 1½ mm. in length, 1 mm. in width and ½ mm. in thickness and weighed but a fraction of a grain.

The magnet, which was operated by a single, small Grenet cell (zinc and carbon), was tested before the operation and found to be capable of lifting a pocket key-ring with four or five keys attached to it.

The after-treatment of the eye consisted in the constant application of a lotion of opium and boracic acid and the instillation of atropia. The improvement in its condition was rapid and uninterrupted, and when the patient left the hospital April 23 (seventeen days after the removal of the foreign body) the

subconjunctival injection had greatly diminished and the vitreous humor was clearing rapidly; the opacity at the anterior pole of the lens was also less marked. Vision at the time was $^{16}/_{XLV}$. The pupillary margin of the iris, at a point corresponding with the wound made in the cornea and iris by the entrance of the foreign body, had formed an adhesion to the lens capsule before the removal of the steel, and this persisted despite the liberal use of atropia.

The case was kept under observation in the out-patient department, atropia only being used, and continued to progress favorable. May 2, Vision had improved to $^{16}/_{XXX}$.

At my request the patient called at my office a few days since (July 6). No treatment had been practiced for some weeks. The difference in the appearance of the two eyes was scarcely perceptible. The pupil of the injured one was not quite circular, and there was just a trace of hyperemia in the finer conjunctival vessels. In the neighborhood of the wound made through the sclerotic at the time of the operation the hyperemia was, of course, more marked, and there was still considerable thickening of the episcleral tissue at the point; but, this could be seen only when the eye was directed upward and the lower lid somewhat everted. The lad assured me that the injured eye gave him no annoyance whatever, and that he felt no dread of light. Upon examining the lens a very small, well-defined circular spot of opacity was found just under the capsule at the anterior pole—the only remains of the more diffuse opacity observed in this part of the lens when the case first came under observation. The peripheral wound through the iris was easily found, but was less conspicuous than when first discovered. The ophthalmoscope revealed no opacities in the vitreous humor and showed a normal fundus except in the region of the sclerotic incision. The site of the latter was indicated by a linear white patch, and just in front of this, and separated from it by an isthmus of normal choroid and retina, there was another spot of atrophy, much smaller and circular in shape, through which the sclerotic could also be distincly seen. I could make out no evidences of retinal detachment.

The small, circular area of atrophy which was situated between the sclerotic wound and the ciliary body, marked, in all probability, the point where the fragment of steel impinged, and to which it remained attached. If such was the case, the point of the magnet must have been in close proximity to the foreign body each time that it was introduced and only failed to extract it at first because, as might have been expected after the lapse of so considerable a time from the receipt of the injury, it had become more or less perfectly encapsuled.

A test of the vision of the two eyes, both of which were decidedly hypermetropic, showed but a slight difference between them. With + .75 s. the left (injured) eye had $V=^{20}/_{XXV}+$, and the right eye with + .87 s. $V=^{20}/_{XX}-$. The possibility of making a further improvement in the vision of each by means of cylinders was not gone into.

It is too soon yet, and probably always will be too soon, to say that an eye which has been through the experience this one has, will never give trouble, but in this present instance I have little fear as to the future.

CONSIDERATIONS ON SOME OF THE CHRONIC AND SEVERER FORMS OF DACRO CYSTITIS.

BY G. STERLINE RYERSON, M.D., C.M., L.R.C.S., EDIN.,

Professor of Ophthalmology in Trinity Medical College, Toronto.

There are two forms of dacro-cystitis which are sources of especial trouble not only to the patient but to the ophthalmologist.

The first is recognized by a very considerable distension of the lachrymal sac, the walls of which are *thinned*, and distended by thin, or less often thick, muco-purulent matter. It often happens that for a day or two together the patient is unable to empty the sac. When empty the walls are in apposition.

The second form presents an enlarged sac which cannot be emptied entirely by pressure because the walls are *thickened.* The discharge in this form is usually muco-purulent, glairy and thick. It is important practically to recognize these two forms as the successful treatment in either case is very different.

In the *thinned* form the duct should be slit up from the puncture, any stricture of the nasal duct freely divided and a No. 6 probe passed daily. Or in case the patient can be persuaded to wear it a silver or celluloid style should be introduced and allowed to remain. The style has many advantages over the probe; it is painless after the first introduction; the patient can go away from the oculist for weeks together without suffering for it; the constant pressure causes the stricture to absorb, and it can easily be kept clean by lifting it daily. Three months constant wearing of a style will cure almost any case of lachrymal stricture. I prefer a piece of pure silver

wire the size of a No. 5 probe, which I cut to the required length, and after filing the sharp edges off, bend so as to suit the curve of the duct which varies a good deal, and form a crook on the upper end so that it shall not slip into the duct. Having made sure that the duct shall remain patent, attention should then be directed to the sac itself. By this injection with Anel's or Panas' syringe and hollow probe of various antiseptic and astringent solutions. The best of these are peroxide of hydrogen, boric acid, methyl violet, but especially Harvey's acrolozone [1] The cure will be hastened by the occasional use of a solution of nitrate of silver, 20 grains to the ℥j, injecting a few drops only. The prognosis in the *thin* form treated in this way is good. From one to three months will suffice to effect a cure.

The treatment of the *thick* forms consists in the ablation of the hypertrophied mucous membrane. It is recommended in most of the works to use various caustics but I have found that laying the sac open freely and scraping the membrane away with a sharp spoon or curette accomplishes the desired end and still leaves a pervious canal. It is generally necessary to insert a style to keep the passage open during healing.

[1] "Harvey's Acrolozone. $C_3H_8O_3+O_3$.—Acrolozone is a new chemical and the most powerful antiseptic, organic disinfectant and bactericide at present known. Acrolozone is prepared in a liquid form, is clear and without smell, the taste is slightly sweetish and not at all unpleasant. Any physician who gives this agent one trial will, I am convinced, in the future reject carbolic acid, iodoform, iodol, boracic acid, etc.

The absolute purity and mode of preparation of "Harvey's" Acrolozone renders this most powerful antiseptic both safe and quick in its action and non-irritating, and at the same time much more staple than hydrogen peroxide. When Acrolozone is brought in contact with a suppurating surface or cavity its action is much more regular and moderate than hydrogen peroxide, and owing to its strength and the vast quantity of ozone it contains, and the method of manufacture, the ozone is not so rapidly decomposed into oxygen and spent. On account of the slower and more even action of Acrolozone the ozone is a very much longer time in contact with the unhealthy surface.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JUNE, 9, 1892.

HENRY POWERS, F.R.C.S., President in the Chair.

DETACHMENT OF THE CHOROIDEA.

Dr. Story (Dublin) reported this case, the notes of which were read by the Secretary. The patient, a female, aged 24, gave a history of failure of sight in the right eye twelve months previously; the eye subsequently became, according to her account, so painful that she wished to have it removed. On admission to the hospital the vision of the right eye was reduced to counting fingers at 1 metre. Soon after admission the pain, of which her account was evidently exaggerated, disappeared. On ophthalmoscopic examination there was found to be a large detachment of the retina extending from the margin of the optic disk downward. No rent was visible in the retina; all over the detached portions were small, brilliant, white spots, and also larger circular and linear white patches of degeneration. The choroid coat was also detached over a corresponding area; its structure could be easily made out through the overlying retina, except where the above-mentioned patches obstructed the view. The tension of the eye was normal and there was no external signs of disease. Reference was made to a case published by the author in the Society's *Transactions* last year.

CHANGES IN THE RETINA, DUE TO LONG-CONTINUED LODGMENT OF A METALLIC CHIP ON THE SURFACE.

Mr. Priestley Smith read notes of the case of a lad, æt. 17, who was struck in the left eye by a fragment of bell metal. When first seen (four weeks after the injury) a small linear cicatrix was visible in the cornea close to its inner margin, behind this a black point in the iris probably indicated an aperture made by the chip. The lens was clear; the chip of metal, triangular in shape, could be seen lying on the retina some distance from the nasal side of the disc, and on rather higher level. Its position was shown by a scotoma in the perimeter chart. The eye was free from pain or other symptoms, and vision was $^{6}/_{18}$. About four months later the foreign body shifted its position to a slight extent, its heavier end moving slightly downward; one month later, the whole chip dropped directly downward through an angle of about 45 degrees, according to the chart. Its former position was marked by a grey opaque patch on the retina, around which was a cloudy zone bordered by a faint pigmentary discoloration. Two scotomata were now shown in the chart, the second one indicating the new position of the chip. Thirteen months after the accident the position of the foreign body remained unchanged; its surface was less lustrous than at first. On the chief arteries and veins of the retina were numerous minute shining points, looking like specks of gold-leaf. The eye remained free from pain or injection, and the lad was regularly at work. Mr. Priestley Smith thought it unlikely that the eye would remain permanently in its present quiet and useful condition. The foreign body, though aseptic in the ordinary sense, was acting surely though slowly as a chemical irritant. The question as to the possible danger of this chemical action to the fellow eye is one concerning which further information is desirable.

The President referred to the case of a man who was struck in the eye by a chip from a hammer, which remained imbedded id the optic nerve for twelve years; the eye had retained

perception of light, and, though liable to slight recurrent attacks of pain, has not caused sympathetic disease in the fellow eye.

Mr. Snell mentioned the case of a boy with a fragment of metal in one eye, but with retention of vision in that eye. He thought it important in these cases to keep the patient at rest for some time after the accident, so that the chip might become firmly attached to the retina or other tissues by the lymph which is thrown out around it.

Mr. Tweedy spoke of a man who had been under his care about ten years ago, in whom a small chip of steel had passed through the cornea and lens and become embedded in the retina. The chip became covered over by grey lymph, and the eye remained perfectly free from pain or irritation. The lens did not become opaque, although a small linear scar was visible in it. The patient was seen at intervals for twelve months after the accident.

Mr. Critchett mentioned a somewhat similar case, which he had watched for three years. During that time the eye remained quiet. and vision was but slightly impaired.

Mr. Lang referred to a case published by the late Mr. James Adams in vol. 1 of the Society's *Transactions*. This patient had a fragment of steel embedded in the retina, and covered by lymph. At the end of five years the eye was still free from irritation and vision $=^{6}/_{VI}$.

RUCURRENT KERATITIS SUPERFICIALIS PUNCTATA, IN WHICH THE USE OF COCAINE AGGRAVATED THE SYMPTOMS.

This case was reported by Dr. Adolf Bronner (Bradford). The patient, a male, aged 48, first suffered from an attack in the right eye in March, 1867, and the disorder recurred every year, usually in March or April, and nearly always in the same eye. During an attack which occurred in 1885, cocaine drops were used, and the consequence was an increase in the severity and duration of the attack. In March, 1892, when the case first came under Dr. Bronner's care, the right eye was again

affected, and the symptoms which had existed for a week, subsided in five days under treatment by atropine. As a result, however, of exposure to a strong wind the left eye became affected. There was severe pain in the eye and forehead, and intense photophobia; the lids were red and swollen, and there was much chemosis. The pupil was dilated, and over the lower half of the cornea there were 15 to 16 small white elevated spots. The application of cocaine produced two or three minute's ease, and then the old pain returned with increased severity, all the symptoms and appearances becoming exagerated. After the subsidence of the attack the cornea was perfectly clear and free from nebulæ. Somewhat similar cases have been recorded by several German authors, and one also by Mr. Marcus Gunn in the Society's *Transactions* for 1890.

Mr. Holmes Spicer mentioned the case of a little girl, æt. 7, who had been under his care. The symptoms and appearances closely resembled those described by Dr. Bronner; except that the recurrences were less regular.

Mr. Gunn referred to cases he had brought before the Society two years ago, soon after Fuchs had published his description of this form of keratitis.

DOUBLE OPTIC NEURITIS AFTER INFLUENZA.

Mr. Simeon Snell (Sheffield) read notes of two cases, both occurring in females, one aged 19, the other $13^1/_2$. In each case failure of sight came on a few weeks after recovery from an attack of influenza. When the elder girl came under observation the neuritis had nearly passed off; the optic discs were atrophied, and all perception of light abolished. The younger patient was seen three weeks after the sight began to fail; the neuritis was then well marked. The right saw $^3/_{CC}$, the left eye $^4/_{CC}$. The neuritis had, to a great extent; cleared up, but the discs were atrophic-looking, and there had been very little improvement in sight. Mr. Snell referred to the cases puqlished by Macnamara and Lee.

Mr. Marcus Gunn mentioned a case under his care at Moor-

fields, in a man, æt. 45. There were very slight visible changes in the discs, but sight in one eye was abolished, and in the other was defective. He thought the case was one of retro-ocular neuritis, and an attack of influenza a short time previously, was the only cause to which the condition could be ascribed. Recovery began in a couple of weeks, and the blind eye regained useful vision.

Mr. Cross (Clifton) referred to two cases he had seen, both in young women, in whom there was no evidence of intracranial disease, and nothing which seemed to bear a casual relation to the neuritis except enfluenza. In these cases vision failed rapidly within a few days of the attack.

Mr. McHardy spoke of two cases he had seen, and which he had considered as most probably due to influenza, no other cause being ascertainable. Both his patients were females, and in both was temporary albuminuria. He had treated them by absolute rest in bed, and the administration of iron; recovery ensued.

CORRESPONDENCE.

Editor AMERICAN JOURNAL OF OPHTHALMOLOGY.—I wish to correct a statement made by me in your January number of this year. One of the operations for entropium there was described consists essentially in making the von Burow cut through the tarsus from the under side turning back the edge of the lid with sutures to make the wound gape, and filling the wound with a piece of lip membrane, or a Thiersch skin-flap. After the description, I added, that while lip might, *a priori*, be considered preferable, on account of the contact of the flap with the cornea, in reality, skin answered just as well; the cornea bearing friction with it perfectly after the first week or so. The seven oparations of the kind which I had then performed led me to make this statement unqualifiedly. Further experience, however, has given me the impression that if the operated lid still contains any trachomatous tissue irritation of the cornea is more likely to recur where skin is used than when the flap is from the lip. As long as copper sulphate is applied regularly the skin flap rubbing on the cornea causes no more sensation than normal conjunctiva, but when this is discontinued for a time, it has seemed to me that corneal irritation occurred oftener than the slight remnants of trachoma would account for. I have consequently used lip almost exclusively in my later operations of this kind.

Sincerely yours, H. GIFFORD.

REVIEW.

MINERS' NYSTAGMUS AND ITS RELASION TO POSITION AT WORK AND THE MANNER OF ILLUMINATION. By SIMEON SNELL, of Sheffield-Bristol. 1892.

For several years Mr. Snell has interested himself in the subject of "Miners' Nystagmus," his first paper having been published ia 1875. Since that time he has been unwearied in his investigation to arrive at the true cause of the affection and to determine whether this was due to the position of the miner while at work, or to the character and quantity of the illumination; this latter having been contended for as the cause by some. .

This work of 143 pages is the summing up of his own experience and experiments as well as that of others, including some on the continent and they prove beyond question that the prime cause is the peculiar position of the laborer when at work. The treatise has a large number of illustrations many of which are reproductions of photographs showing the various positions assumed by the operators while at work.

BURNETT.

SELECTIONS.

AN OVERLOOKED FACTOR IN THE PRODUCTION OF CONJUNCTIVITIS.[1]

BY JULIUS POHLMAN, M.D., BUFFALO, N. Y.

We are told by ophthalmologists that the eye when exposed to artificial illumination depends upon three distinct qualities of the light for its well-being, namely, (1) its whiteness, (2) its steadiness, and (3) the amount of heat which it eradiates.

Hardly anybody will dare to underestimate the importance of the whiteness and the steadiness of a light. Optic nerves are organs specialized to receive sunlight, and hence the nearer the artificial illumination resembles it, *i. e.*, the whiter it is, the more the eyes remain in their natural condition; and the labor of the optic nerve, to adapt itself to the artificial surroundings, by means of muscular exertions, is reduced to a minimum to the advantage of the eye as a whole,

When we consider the function of the iris, to regulate the quantity of light which is to strike the retina and to reduce the variations of that quantity to the minimum, we can understand how a flickering flame, no matter how white, necessitates an immense strain upon this delicate muscular apparatus, a strain which increases with the unsteadiness of the light.

The third factor, however, the heat which the light eradiates, in its influence upon the eye, does not seem so plain. We are taught that heat affects the conjunctiva, and that conjunctivites

[1]Read at the meeting of the Alumni Association, Buffalo University Medical College, May 3, 1892.

are often found in occupants of poorly ventilated rooms where hot lights are burning more or less all day; and that certainly seems to demonstrate the correctness of the theory. Nevertheless, how heat, *i. e.*, a simple difference in temperature, should injure the conjunctiva enough to produce pathological conditions, has never seemed quite clear to the writer, because, if this depended merely upon a quantity of heat, then why should a temperature of 75° or 80°, produced by gas flames injure the conjunctiva, when a summer heat of 95° or 100°, or even more, does not? If simply a question of temperature only, then the effects ought to be the same, no matter what the source of the heat, because the whole eye is subjected equally to its influence and not a small part of it alone; were it otherwise, we might defend the apparent difference in the effects of natural and artificial heat on the same lines as we differentiate between wind and draught: one striking the whole body, the other only a circumscribed portion of it, thus having differing conditions with differing results. But this line of reasoning cannot be applied to the eye. As, however, the effect produced on the eye by the heat of artificial light does differ from that produced by natural heat, we must look for other or additional causes which injure the conjunctiva.

Dr. Frank P. Vandenberg, for many years City Chemist of Buffalo, informs me that the manufacture of light gas in this city is rather behind the times; made from bituminous coal by the old-fashioned process of dry distillation, it always contains a considerable quantity of sulphur; for instance, the average of numerous analyses shows that the product of the Buffalo Gas Light Company has 12.08 grains of sulphur in every 100 cubic feet of gas; the Mutual Company, 12.93 grains, and the Citizens' Company, 9.68 grains. That means that for every 100 cubic feet of gas burned, ten to twelve grains of sulphur are given to the air in the form of fumes, which, as we all know, have a special affinity for moist surfaces forming there sulphurious acid.

Several years ago the leading librarians of the country made quite extensive reports upon the corroding influence of gas

light upon the leather bindings of books. If the sulphur compounds can corrode leather in the course of time in large well-ventilated libraries, are we not justified in assigning some influence to them when acting on the moist conjunctiva in a poorly-ventilated room with gas burning, perhaps, all day, or throughout the time when the eyes are exposed to the heat of the flame?

It may be quite appropriate here to mention that the natural gas used in Buffalo contains no sulphur, and will, therefore, with the right kind of burner, produce a light superior to that of artificial gas as far as any injurious effect upon the conjunctiva is concerned.

More important, however, to the eye than this small amount of sulphur is the quantity of moisture which air holds under varying temperatures. It is an old and well-known fact that the hotter the air, the larger the amount of water which it contains, and the lower the temperature the smaller the amount, all other things being equal. Supposing a room contains a certain amount of moisture at 50° when the outside air is 40°, then, if we raise the temperature of the room to 70°, we must apply a certain amount of water for evaporation in order to have the air and warmth feel agreeable, *i. e.*, not too dry; for the outside air coming in at a much lower temperature is still drier than that contained in the room originally, and we must resort to artificial means in order to supply the demand.

Artificial heat in its drying effect upon furniture, doors, etc., has often been discussed, but it seems that such discussions have always stopped at dead matter and have never been applied to living bodies.

To investigate the effects of the dryness of the air on the conjunctiva, the following experiments were made:

The room used was 12 x 13 feet, 9 feet 6 inches high, and heated by natural gas burned in an open front Jewett gas burning stove; this particular kind of stove has a water-tank at its back which holds two quarts of water, and forms part of the structure, so that the flames play directly against one side of it. When running at full blast, to keep the room at 65° to 70°,

the contents of the tank evaporated in about six hours; in other words, it took about two gallons of water in twenty-four hours to keep the air of the room supplied with the moisture necessary for its temperature when it was freezing outside.

The ventilation of the room and the draught of the stove were perfect, and no product of combustion, complete or incomplete, or other gases of any kind from leaks in pipes or otherwise, could enter the room and mix with the air; all sources of error in this direction were avoided as carefully as possible, so that the effects produced upon the eyes of the occupants of the room were due solely to the peculiar condition of its atmosphere and to nothing else.

The experiments were made at thirty different times, lasting from thirty minutes to two hours each, upon the writer's own person. The effects produced were repeatedly corroborated by visitors who happened to call at such times, and who knew nothing about the experiments to which they were unconsciously subjected during their visits; hence, their complaints would have to be called entirely unbiased and unprejudiced, but their symptoms were always identical with those experienced by the writer.

With a temperature of 65° or 70° when the water-tank on the stove was empty and the air of the room relatively dry, an exposure of fifteen minutes made the eyes feel dry and sticky; if prolonged for another fifteen minutes, or if the temperature was raised to 80° or 85°, the symptoms became more decided, —the peculiar sensation of a foreign body in the eye, like a particle of sand or some stringy substance, became very strong. The conjunctival vessels of the lids looked engorged, the more the longer the exposure, and after a stay in a dry atmosphere of 80° for about two hours, the conjunctival vessels of the bulb were equally well marked, and the eye presented in every symptom a well-developed case of acute conjunctivitis.

While cold has a stimulating effect upon the lachrymal gland, heat apparently does not act in that way; whether it has an inhibitory function, is not yet decided, but it certainly

does not increase the secretion, and though the ordinary amount of lachrymal fluid is sufficient to keep the eye moist and clean under ordinary conditions, the gland does not secrete fluid enough when the air is too dry for its temperature, and hence calls for a more rapid evaporation from all moist surfaces. The eye tries hard to overcome this deficience by increased winking, but to no avail; evaporation from the conjunctiva proceeds quicker than the moisture is supplied by the lachrymal gland, and its surface becomes proportionally dry, producing after awhile the disagreeable sensations of conjunctival troubles.

Whether the mechanical irritation produced by the friction of the dry conjunctival surfaces has the effect of dilating the capillaries and producing in this wise a slowing of the blood stream with the attending phenomenon of engorgement, or whether the heat has such an effect upon the partially dry eye which it would not have upon the normally moist organ, or whether there are other causes which, by themselves or in addition to those mentioned, produce the engorgement, must be left for additional investigations to decide, but that the acute conjunctivitis, mild or severe, was caused by the dryness of the air and not by the heat, was demonstrated during every experiment as follows:

Whenever, during the course of an experiment, the water-tank on the stove was filled, and free and rapid evaporation restored the equilibrium between heat and moisture, then, no matter whether the temperature of the room was 65° or 85°, the annoying symptoms disappeared in a few minutes if the exposure had not been too prolonged. In the early stages of the experiments, just when the eye commenced to feel sticky, a simple dropping of a few drops of water between the lids caused an almost instantaneous disappearance of the distressing sensations, but they returned equally promptly, and with unvarying certainty, if the eye was again exposed to the dry air. If bathed continually, no matter how hot or how dry the eye, the eye felt as comfortable as under normal conditions,

and none of the symptoms appeared as long as the conjunctiva was supplied with the required moisture.

What happens in the room as a whole, will take place on a smaller scale in the vicinity of a lamp,—the temperature is raised and the air is dried correspondingly, and whenever the eyes are near enough to the flame to feel its heat, they will be affected by the dryness of the air, and the hotter the light the dryer will be the air that surrounds it.

If additional observations prove this theory to be correct, then we can understand way a summer temperature of 95° or 100°, holding its normal quantity of moisture, has no effect on the eye, while artificial heat of 70°, with its usual corresponding dryness, can produce very decided forms of conjunctival troubles, and we learn that a little closer atttention to the water-pan on the furnace or on the stove, is as necessary to the well-being of our eyes as the efficient lighting of the room. And if repeated experiments finally develop the fact that heat has no effect upon the conjunctiva, then we have to modify our teaching regarding the well-being of our eyes under artificial illumination, and name as the three factors necessary, whiteness and steadiness of the light, and moisture in the air surrounding the flame proportionate to its temperature.—*Buffalo Medical and Surgical Journal.*

ANTISEPSIS IN OPHTHALMOLOGY.[1]

BY S. G. DABNEY, M.D.

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We are told by Dr. Knapp that in 1871 he made a visit to Edinburgh with the special purpose of acquainting himself with Lister's method, and when he asked Lister whether this method would be productive of much benefit in ophthalmic practice, he replied in the negative. The small field of operation, the protection afforded by the lids, the antiseptic lachrymal secretion, and the usually simple instruments employed, all combined to render the duty of infection less in operations upon the eye than in most other parts of the body. Nevertheless, almost every ophthalmic surgeon would now feel that he was subjecting his patients to an additional element of danger by neglecting antiseptics, or at least careful asepsis, in every surgical procedure; moreover, the successful treatment of many diseases of the eye rests on a knowledge of their infectious character and the proper application of antiseptic agents. I wish, therefore, to briefly call attention to antisepsis in ophthalmology, first, its application to operations on the eye and its appendages, and secondly, in the treatment of ocular disease.

Strictly speaking, we aim rather at asepsis than antisepsis in ophthalmic surgery. Before any operation on the eye or the

[1]Read before the Thirty-seventh Annual Meeting of the Kentucky State Medical Association.

lids, the parts should be very carefully cleansed with hot water and with a 1-4,000 solution of bichloride of mercury. Especial attention should be given to cleansing the lids near the margin, as Weeks has shown that this locality is a favorite lurking-place for pathogenic germs. A solution of the bichloride of the strength indicated will not usually be found irritating, but in case of extraction of cataract this drug has caused opacity of the cornea, and by many a four-per cent solution of boracic acid is preferred. The investigations of Weeks show this drug to be almost without effect on the staphylococcus pyogenes aureus, but it is still largely used in ophthalmic practice.

To cleanse instruments boiling water is the very best agent. According to Gerster the liability to rust may be removed by adding common soda, a tablespoonful to the quart. A solution of carbolic acid strong enough to be a speedy and certain antiseptic is disagreeable to the surgeon's hand, and bichloride of mercury to be efficient would be likely to injure the instruments, hence the superiority of hot water.

During the progress of an operation where considerable dissection of the tissues is required, as occasionally in muscular advancement and plastic operations, the parts should be frequently irrigated with a solution of bichloride of about 1 to 4,000.

As regards the surgeon's hands, thorough cleansing with hot water, soap, and nail-brush is alone sufficient, but additional precaution may be obtained by immersion in a solution of the bichloride of mercury, 1-1000. In cataract operations it is the custom of some operators to wash out the anterior chamber, thus removing any remaining cortical fragments with a boracic-acid solution, but in general it is safer to accomplish this end by gentle pressure, milking out with an instrument applied to the lower part of the cornea. Knapp warns against using the edge of the upper lid to make counter-pressure on the wound, as he considers this a dangerous source of infection. After operating for stricture of the lachrymal duct, it is

well to inject through it a solution of bichloride of the strength above indicated.

As regards the dressing after operation, it may be very simple. A little lint smeared with vaseline is laid over the closed lids, and upon this a layer of absorbent cotton soaked in a solution of the bichloride, and finally, a little dry absorbent cotton to fill out the orbit, the whole held in place either by strips of adhesive plaster or a roller bandage. For my own part, after using the adhesive plaster dressing for several years, I have returned to the roller bandage, as I find this more comfortable to the patient and to more thoroughly steady the eye.

It is not wise to put the bichloride dressing immediately next to the skin, as a very disagreeable erythema is often so produced. The presence of diabetes mellitus probably increases the dangers of suppuration after an operation in the eye as elsewhere, and yet the statistics of removal of diabetic cataract do not show any greatly excessive number of suppurative cases. Of course, the diabetes should be reduced as much as possible before the operation. Careful examination of the tear-sac should be made before any operation on the eye-ball. A chronic dacro-cystitis is a most dangerous source of infection in such cases.

It is a remarkable fact that the apparently simple operation of needling for capsular cataract, even when performed with every antiseptic precaution, is sometimes followed by suppuration. Knapp accounts for this on the theory of latent pyogenic germs in the eye being excited to activity by this second operation. I have seen no cases in my own practice as yet.

The prophylactic treatment of sympathetic ophthalmia by injection of a solution of bichloride of mercury into the eye as suggested by Abadie, has not, so far as I know, found any advocates in this country.

It is, however; in the treatment of corneal and conjunctival disease that antiseptic remedies are of the greatest value in ophthalmology.

First, in importance here, because in my experience first in its efficacy, I would place the actual cautery in the treatment

of suppurating ulcers of cornea, especially that form known as ulcus serpens. I have found this treatment infinitely superior to any other in this disease, At my clinic at the Hospital College I have on several occasions simply cauterized the ulcer once with the red hot probe, prescribed the application of a hot solution of the bichloride at home, and been rewarded a few days later by seeing the eye far on the road to recovery. The application of 4% solution of cocaine renders the burning painless.

Next in its value and of wider application is nitrate of silver, a remedy long used with great success in diseases of the eye, and also, like every other powerful agent, liable to most dangerous and disastrous misapplication. According to the bacteriological experiments of Weeks, 1% solution of nitrate of silver is a most speedy and certain destroyer of the staphyloccus pyogenes aureus, and presumably of the gonococcus of Neisser also; hence arises the great value of this drug in suppurative conjunctivitis.

The bichloride of mercury solution, from 1-5,000 to 1-10-000, is also of frequent advantage in suppurative ophthalmias and in ulcers of the cornea. I prefer it in cases of inflammation the tear-sac. The solution should be passed into and if possible, through the sac into the nose with the lachrymal syringe after slitting the canaliculis. It is in diseases of the tear-sac, and scarcely anywhere else, that pyoktanin still finds some use in ophthalmology. A solution of 1-1,000 is a safe antiseptic, but after a trial of it in several cases I do not believe it to be at all superior to the bichloride. This aniline dye, for which such extravagant claims were advanced a few years ago by Stilling, of Strassburg, and which for a time found a wide application both in solution and in solid stick, and even as intraocular injection, has almost lost its place in ophthalmology, and except in tear-sac disease, and by some in ulcers of the cornea, is rarely used.

The peroxide of hydrogen, too, has but a limited field of usefulness in ocular disease. It may be used to advantage in purulent dacryo-cystitis, but if strong enough to be efficient, it

will be painful to the eye, and hence should be preceded by an application of cocaine. Where there is an ulcer of the cornea with purulent base and edges, the bubbling peroxide beautifully outlines the ulceration; but in my experience it is not nearly so valuable an application here as the actual cautery.

In certain forms of phlyctenular ophthalmia the dusting of the phlyctenulæ is a most valuable local treatment. Since Weeks has shown that calomel has a high rank as an antiseptic, we may probably account for its action in such cases on this ground. The yellow oxide of mercury salve is valuable in the same way. The oil of cade is a useful application in many cases of marginal blepharitis, and it too is an antiseptic of deciced strength.—*Am. Prac. and News.*

STEEL IN THE IRIS FOR TWENTY-SEVEN YEARS —SYMPATHETIC INFLAMMATION—OPERATION—RECOVERY.[1]

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In the *Medical News* of October 10, 1891, was published the following article by Dr. F. C. Heath, then of Lafayette: "Sometime in 1864, Mr. P. E. H. was engaged in reaming a tire on a locomotive engine, when a small piece of steel, about two mm. long, from the reamer, penetrated the corner of his right eye, lodging in the iris about midway between the pupil and the outer margin. In about four weeks the "irritation" fully subsided. It gave no further trouble until five years ago, when inflammation arose, as he thought, from irritation of the eye by gravel. This quieted down after a week's treatment by Dr. J. L. Thompson, of Indianapolis. The patient came to me in June last, with a well-marked iritis that had started five days before. He again made a good recovery under two weeks' treatment with atropine, leeches, etc., and the eye has been free from pain, ciliary injection, and other symptoms of iritis, ever since. The vision is unaffected. It is exceptional for a foreign body to remain so long in the iris, and produce so little trouble. Noyes mentions a similar case of nineteen years' duration, but this is twenty-seven."

In the New York *Medical Journal*, November 28, 1891, in "Reports on the Progress of Medicine," under the title of General Surgery, by Matthias L. Foster, the report ends thus: "Heath reports (*Medical News*, October 10, 1891), a remarka-

[1]Read before the Indiana State Medical Society, May 13, 1892.

ble case in which a piece of steel penetrated the cornea of the eye of a man in 1864, lodged in the iris and way between the pupil and the outer margin, and did not cause material injury to the eye. Two subsequent attacks of inflammation may have originated from the presence of the foreign body. But he made a good recovery each time, and the vision is unaffected. It is exceptional for a foreign body to remain so long in the iris and produce so little trouble."

Thus ends the first chapter of the experiences through which this unique case passed. But this is not all. December 10, 1891, he presented himself in my office with an intense inflammation. which he said had been in existence for ten days past. He thought it would subside by using Dr. Heath's prescription. He was immediately warned of the dangers of sympathetic inflammation. The media of both eyes were clear. Treatment consisted of leeches, atropia and hot fomentations, persistently applied. Gradually the eye became worse. On the morning of December 15, when he presented himself for examination, pain was more intense than ever, photophobia marked, lachrymation profuse, and the vitreous of the inflamed eye was clouded. The left eye showed photophobia and lachrymation with slight cloudiness. When told of the condition and the danger of further delay, and the probability of cure, he consented to an operation, which would attempt the removal of the steel. At 11 o'clock of the same morning, in company with Drs. Irwin, Throckmorton and Wetherill, we repaired to his home. A four per cent solution of cocaine had but very little effect upon the inflamed eye. A much stronger solution was used, and within ten minutes after the first instillation of the stronger solution the eye yielded to its influence.

An incision, involving one-sixth of the corneal circumference, was made downward with a von Graefe cataract knife. An electro-magnet was introduced, but upon making gentle traction I found the foreign body to be very firmly embedded. There were the dangers of bringing the iris with it, and of luxating the lens. The latter danger was certainly well grounded, as revealed by subsequent ophthalmoscopic examination. There-

fore the magnet was laid aside. I then introduced Liebreich's rotating iris forceps, and after a few minutes of gentle teasing the piece yielded and was withdrawn, the iris remaining in place. The cornea was unscratched.

A perforation, which persists to the present day, was left in the iris corresponding to the former seat of the steel. As it has healed, the perforation he will carry through life.

The recovery was uneventful. Every night preceding the operation since the iritis first developed, he suffered intense pain, which neither morphine nor cocaine relieved. The first night succeeding the operation he passed the entire night in sound sleep, not evincing the slightest pain. The inflammation subsided, and the vision is $^{15}/_{XV}$ in each eye.

The piece of steel proved to be three-sixteenths of an inch long, and quite irregular. The thickest portion was the part which showed in the iris, and was as Dr. Heath describes. The rest of the piece lay behind the iris, and in contact with the lens capsule. The piece was unfortunately lost in the bustle of cleaning instruments and returning to the office.

Present Condition.—He has had no attack of iritis since the operation. There is a small hole in the iris where the steel lay. The pupil is ovoid—the small end of the ovoid corresponding to the former position of the steel. In other words, the bridge of iris sags at this point, which may be due to the loss of control which the sphincter has sustained, because of the loss of a foundation at this point; or it may be paralyzed because of being unused for twenty-seven years. Ophthalmoscopic examination reveals a spot upon the lens capsule, where the steel had been embedded. This justifies me in the belief that it was best to lay aside the electro-magnet, and resort to gentle teasing to dislodge the piece.—*Indiana Medical Journal.*

CLINICAL HISTORY OF A CASE OF SUCCESSFUL EXTRACTION OF A PIECE OF STEEL FROM THE IRIS AND LENS BY AN IRIDECTOMY, WITH SUBSEQUENT ABSORPTION OF THE LENS AND RECOVERY OF NORMAL VISION.[1]

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On the second day of March, 1891, H. M., æt. 29, a blacksmith, came to Wills' Eye Hospital complaining that his right eye had become inflamed from the supposed lodgement of some foreign substance in the cornea one day previously. Attempts at extraction had made the eye very painful, which was relieved by the use of a weak infusion of tea-leaves. Two years previously the same eye had been struck by a piece of steel, measuring roughly about four millimeters square, the foreign body not penetrating the eye, although leaving the organ irritated for several days' time. Subsequently vision was in no way disturbed, and the organ had never become troublesome up to the time of the second accident.

At the time of the first examination of the second traumatism a small mass of foreign substance was found embedded in the upper inner quadrant of the cornea, about three millimeters above the horizontal meridian, and in almost identical position in the underlying iris, there was a round black bead of about the size of the head of a small pin, from the upper part

[1]Read in the Section of Ophthalmology at the Forty-Third Annual Meeting of the American Medical Association, held at Detroit, Michigan June, 1892.

of which could be seen, by strong oblique illumination, a line of metallic-like lustre A faint deposit of precipitates on the membrane of Descemet, with slight pericorneal injection, existed, though there was no evidence of any ciliary tenderness. Vision with this eye has fallen to slightly less than one-eighth ($^5/_{XL}$?), and the accommodative range was limited to the reading of type 0.75 D., from thirteen to thirty centimeters. Through the undilated pupil the eye-ground could be fairly seen, it appearing healthy. No abnormality could be noticed in the left eye, its vision being one, one and a halfths ($^5/_{7.5}$), and its accommodative range for 0.50 D. type, extending trom thirteen to thirty-six centimeters.

The foreign substance was removed from the cornea, and upon consultation with Dr. Wm. F. Norris an immediate iridectomy, including the piece of supposed metal, was advised; the latter procedure, however, the patient refusing to accept. Upon this decision a soothing collyrium of boric acid and a Liebreich bandage were ordered, with a request that he should report in the morning.

Upon the following day the patient returned to the hospital stating to the resident surgeon, Dr. M. W. Zimmerman, that an exacerbation of pain in the eye during the night had decided his willingness to return for the operation. He was immediately put to bed, his bowels were purged, the eyes were bathed freely, and he was kept quiet until the next clinic day, March 4, when, upon re-examination, the anterior chamber was found somewhat shallow, and the lens was slights swollen and becoming opaque in the position of the situation of the foreign body.

At this time the iris tissue in the vicinity of the traumatism was noted as muddy in appearance, with the formation of a synechia at the upper pupillary edge, the ciliary region being slightly tender to the touch. In spite of the appearance of these inflammatory conditions, a narrow incision, at a position in the cornea just inside of the limbus, corresponding with that of the foreign body, was made with an angular keratome, and an iris forceps passed in and the object, a flat piece

of steel of about one millimeter in diameter, with the surrounding bruised iris tissue, grasped, brought out and excised, making a clean iridectomy. The lens area exposed to view showed the point of the original wounding of the capsule, with the situation of the greatest amount of swelling and opacity. Atropine and a light pressure bandage were applied, and the internal administration of small tri-daily doses of calomel, with rest in bed, were enjoined. In two days' time the wound in the cornea had healed, the inflammatory symptoms had greatly subsided, and the lens matter had begun to rapidly absorb, until on the eighteenth day of the month there was but one piece of lens material to be seen; this being situated in the lower portion of the anterior chamber. Eleven days later the remaining lens mass had disappeared, the eye was quiet, and vision could be brought to almost normal by the use of a + s. 11 D. lens.

At the present time, about fifteen months after the accident, there is a perfectly qviet eye, with a narrow coloboma up and in. An eye which, in spite of a few fine linear capsular folds at the lower inner border of the pupil, which can be barely recognized during moderate pupillary dilatation, and a narrow concentric peripheral ring of lens and capsule debris, which can only be seen at the periphery of the coloboma, possesses normal acuity of both central and peripheral vision; the patient having an acuity of ($^3/_5$) with + s. 11. D.+c. 0.50 D. ax. 100°, and reading many words of type 0.50 D. readily, and all of type 0.50 D. fluently, at eight inches distance, with an additional convex lens of four diopters strength.

The case is interesting on account of the immediate curative effects of an iridectomy which removed an offending substance and its bed of bruised and inflamed iris tissue, thus allowing a free rapid swelling and disintegration of lens matter to take place uninterruptedly during a watchful and careful after-treatment; this immediate happy result being supplemented by a subsequent restoration of vision to full acuity, with but little necessary correction of astigmatism in a comfortable and unirritated organ.

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